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Epidemiologic Notes and Reports

Outbreak of *Salmonella enteritidis* Infection Associated with Consumption of Raw Shell Eggs, 1991

Salmonella enteritidis (SE) is the most frequently reported *Salmonella* serotype in the United States. From January through December 1991, state health departments reported 66 outbreaks of SE in the United States to CDC. This report describes an SE outbreak associated with consumption of raw shell eggs and underscores the necessity of adequately cooking shell eggs.

During October 1991, 15 persons who ate at a restaurant during a 9-day period developed gastroenteritis. A case was defined as a positive culture for SE in a person who had eaten at the restaurant during October 17–25 and/or diarrhea and vomiting that developed within 3 days of eating at the restaurant on those dates. Predominant symptoms were diarrhea (100%), fever (92%), abdominal cramping (92%), nausea (83%), and chills (75%). The median incubation period was 24 hours (range: 12–48 hours); median duration of illness was 7 days (range: 4–10 days). Thirteen ill patrons sought medical care, eight required intravenous rehydration, and six were hospitalized. *Salmonella* group D was isolated from stool of all 13 ill patrons who submitted specimens; all of the eight isolates further typed were identified as SE. Fourteen of the 15 ill patrons and none of 11 well patrons interviewed had eaten Caesar salad (Yates corrected chi-square, $p<0.01$). Illness was not associated with consumption of any of the restaurant's other uncooked egg dishes.

During the outbreak, 23 (29%) of the restaurant's 78 employees had onset of gastroenteritis. Predominant symptoms were diarrhea (100%), abdominal cramps (70%), chills (61%), nausea (57%), and fever (52%). Median duration of illness was 5 days. Two employees sought medical care; neither was hospitalized. Of the 66 employees for whom cultures were obtained, SE was isolated from stool samples of 15 (68%) of the 22 ill employees and six (14%) of 44 asymptomatic employees. Stool specimens from all three employees who reported eating Caesar salad during the outbreak were culture-positive for SE; however, most (18 [86%] of 21) culture-positive employees did not report eating this food. Confirmed SE infection among employees

Salmonella enteritidis – *Continued*

was associated with exposure to raw eggs at the restaurant through consumption or handling. Employees with confirmed SE infection were more likely than those not confirmed (i.e., culture-negative or not cultured) to have eaten the restaurant's raw egg dishes (six [50%] of 12 versus seven [18%] of 40; odds ratio [OR]=4.7; 95% confidence interval [CI]=1.0–24.2), or to have handled raw eggs in the restaurant kitchen (seven [54%] of 13 versus five [17%] of 38; OR=7.7; 95% CI=1.5–42.8).

The Caesar salad dressing was prepared early in the morning by combining 36 yolks from hand-cracked eggs with olive oil, anchovies, garlic, and warm water. Neither lemon juice nor vinegar were included in the recipe. Batches of Caesar dressing were prepared daily except for one 3-day period when a single batch was used. The dressing was refrigerated until the restaurant opened, when it was placed in a chilled compartment in the salad preparation area for approximately 8–12 hours until the restaurant closed. By the time a restaurant inspection was conducted, the restaurant had eliminated Caesar salad from the menu. However, at the time of the inspection, the temperature of other salad dressings present in this compartment was 60 F (15.6 C).

The restaurant obtained eggs from a single supplier twice weekly and stored them in a walk-in refrigerator until use. No eggs from the shipment implicated in the outbreak were available for testing at the time of the restaurant inspection, but three cases of eggs from a different shipment from the same supplier were available. Two pools of 10 eggs each from each of the three cases were sampled and submitted for culture. SE was isolated from one of the six pools. Phage typing of the SE isolate from the eggs and of one from an ill employee revealed that both were phage type 8. A traceback by the SE Task Force, U.S. Department of Agriculture (USDA), determined that the source flock for eggs used during the outbreak was the same flock from which the SE-positive eggs were obtained. The flock had been destroyed before recognition of the outbreak.

Reported by: Enteric Diseases Br, Div of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: From 1976 through 1990, isolation rates for SE increased in the United States (Figure 1). In 1990, the 8591 SE isolates reported through CDC's *Salmonella* Surveillance System represented 21% of all reported *Salmonella* isolates, surpassing *S. typhimurium* to become the most frequently reported serotype.

During 1985–1991, state and territorial health departments reported 375 SE outbreaks, which accounted for 12,784 cases of illness, 1508 hospitalizations, and 49 deaths (Table 1). Most SE outbreaks have historically occurred in the New England and mid-Atlantic states; however, in 1991, 39 (59%) of the 66 reported outbreaks occurred outside these areas.

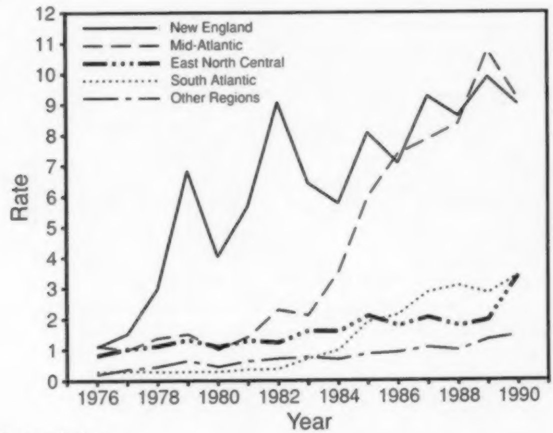
An estimated 0.01% of all shell eggs contain SE; however, this percentage may be higher in the northeastern United States (*1*). Consequently, foods containing raw or undercooked eggs (e.g., homemade eggnog or ice cream, hollandaise sauce, and Caesar salad dressing) pose a small risk for infection with SE. Because most serious illnesses or deaths associated with these infections occur among infants, the elderly, or immunocompromised persons, special attention should be directed to the diets of these persons to prevent the consumption of foods containing raw or undercooked eggs. In contrast, commercial eggnog is made with pasteurized eggs and is safe.

Most cases of SE infection occur as sporadic cases or in limited family outbreaks, rather than as part of large common-source outbreaks. Many sporadic cases are

caused by the same phage types as egg-associated outbreaks and are likely to have the same source (*2*). However, when commercial kitchens serve foods made with contaminated eggs that have not been sufficiently cooked to kill *Salmonella*, large numbers of persons may potentially become infected. The outbreak described in this report may be the first time SE infection has been documented as a potential occupational hazard for employees preparing raw egg dishes in restaurants. Commercial food-service establishments can reduce the risk for outbreaks and infections among employees by using pasteurized egg products or eliminating eggs in such recipes. Infections acquired by eating foods prepared in the kitchens of private homes can be reduced through improved education of consumers regarding the risks for eating raw or undercooked eggs and through increased availability of pasteurized eggs in the retail marketplace.

To address concerns regarding the SE infection issue and consumption of contaminated shell eggs, both USDA and the Food and Drug Administration have

FIGURE 1. Isolation rate* for *Salmonella enteritidis*, by region – United States, 1976–1990



*Per 100,000 population.

TABLE 1. Number of reported outbreaks and associated cases and deaths caused by *Salmonella enteritidis*, by year – United States, 1985–1991

Year	Outbreaks	Cases	Deaths
1985	26	1,166	1
1986	48	1,539	6
1987	52	2,450	15
1988	40	1,010	8
1989	76	2,377	14
1990	67	2,132	2
1991	66	2,110	3
Total	**375**	**12,784**	**49**

Salmonella enteritidis – *Continued*

implemented a series of control measures. Beginning in February 1990, USDA began investigating egg-laying flocks whose eggs are epidemiologically implicated in human SE outbreaks. Eggs from flocks infected with SE (by culture of the flock environment and internal organs of hens) are diverted to pasteurization or the flocks are voluntarily destroyed. In 1991, Congress enacted legislation that mandates refrigeration of eggs during interstate shipping. These efforts are part of the concerted effort needed to ensure safe eggs for consumers. Commercial food-service establishments can reduce the risk for foodborne SE illness if they substitute pasteurized eggs for pooled eggs whenever possible, serve pooled egg dishes immediately after cooking, and do not serve foods containing raw or undercooked eggs.

References

1. Mason J, Ebel E. APHIS *Salmonella enteritidis* control program [Abstract]. In: Snoeyenbos GH, ed. Proceedings of the Symposium on the Diagnosis and Control of *Salmonella*. Richmond, Virginia: US Animal Health Association, 1992:78.
2. Rodrigue DC, Cameron DN, Puhr ND, et al. Comparison of plasmid profiles, phage types, and antimicrobial resistance patterns of *Salmonella enteritidis* isolates in the United States. J Clin Microbiol 1992;30:854–7.

Effectiveness in Disease and Injury Prevention

Public Health Focus: Fluoridation of Community Water Systems

Although fluoridation of community water is highly effective in reducing the occurrence of dental caries, the prevalence of dental caries remains high in the United States. For example, a survey of school-aged children during 1986–1987 indicated that 50% of those aged 5–17 years had caries in their permanent teeth, and among 17-year-olds, the prevalence of caries was 84% (*1*). In addition, among certain populations (e.g., rural and inner-city residents, children whose parents have less than a high school education, and some racial/ethnic minorities), the prevalence of dental caries among children ranges from 52% to 92%. This report summarizes information regarding the efficacy, effectiveness, and cost-effectiveness of fluoridation of public water supplies in the United States.

Efficacy/Effectiveness

The association between fluoride in drinking water and reduction of dental caries was first documented in the 1930s in communities with naturally occurring fluoride (*2*). However, it became necessary to validate and quantify efficacy when alternate systemic and topical methods to deliver fluoride were proposed.

In 1945 and 1946, independently conducted community trials to assess the effectiveness of water fluoridation were initiated in four communities in Canada and the United States (Brantford, Ontario; Evanston, Illinois; Grand Rapids, Michigan; and Newburgh, New York) (Table 1). Four nearby and demographically similar communities were selected for comparison. Following fluoridation for 13–15 years, the prevalence of caries decreased 48%–70% among 12–14-year-olds in the four communities (*2*). Studies in other communities indicated that, following fluoridation for 10 years, the prevalence of caries decreased 45%–94% (median: 58%) among children (*3*).

By the early 1980s, epidemiologic evidence indicated that the prevalence of dental caries was declining throughout the United States (*5*). From 1971 through 1987, three

Fluoridation — Continued

national surveys of U.S. children demonstrated a continued decrease in caries prevalence (*1,6,7*) (Figure 1). The most recent national survey, conducted during 1986–1987 (*1*), indicated that the prevalence of caries among children with a history of lifelong exposure to optimally fluoridated water* decreased 18% when compared with the prevalence among children with no exposure to optimally fluoridated water. Prevalence decreased 25% when the analysis excluded children with any history of fluoride therapy (e.g., dietary supplements or professionally applied topical treatments) (*4*). In addition, recent studies have found consistently lower caries prevalence, both on coronal and root surfaces, among adults who live in communities with optimal or greater fluoride than among those from communities with lower fluoride levels in the water supply (*4*) (Table 1).

In clinical trials, epidemiologic studies, and national surveys conducted during 1973–1988 (*8*), children aged 6–13 years living in fluoridated communities averaged 0.8 new dental caries (decayed, missing, or filled surfaces [DMFS]) per year. In comparison, an average of 1.5 DMFS occurred each year among children living in fluoride-deficient communities.

Cost-Effectiveness

The direct cost of fluoridating public water supplies is related to a variety of factors, including size of the community, number of wells and treatment plants, amount and type of equipment, amount and type of fluoride chemical, and personnel costs (*9*). Annual costs of water fluoridation per capita varied inversely with community size,

*Ranges from 0.7 mg/L to 1.2 mg/L based on an annual average of the maximum daily air temperature.

TABLE 1. Percentage of dental caries reduction for selected studies of water fluoridation reported in different time periods — North America, 1945–1987

Study time period/Population	No. studies reported	Survey dates	Subject age (range or mean)	% Dental caries reduction (range)	% Dental caries reduction (median)
1945–1960: Initial community trials (reference *2*)					
School children	4	1945–1960	12–14	48–70	56
1955–1975: After 10 yrs fluoridation (reference *3*)					
School children	5	1955–1975	6–10	50–94	59
	5	1955–1975	6–16	45–71	57
1977–1987: (reference *4*)					
School children (primary teeth)	2	1984–1987	3.5– 5	30; 39	–
School children (mixed teeth)	9	1977–1987	8–14	9–57	26
Adolescents (permanent teeth)	4	1979–1987	14–17	8–37	30
Adults					
Coronal caries	2	1978–1984	41	20; 28	–
Root caries	1	1984	41	88	–
Root caries	2	1982–1985	60–75+	17; 35	–

Fluoridation — Continued

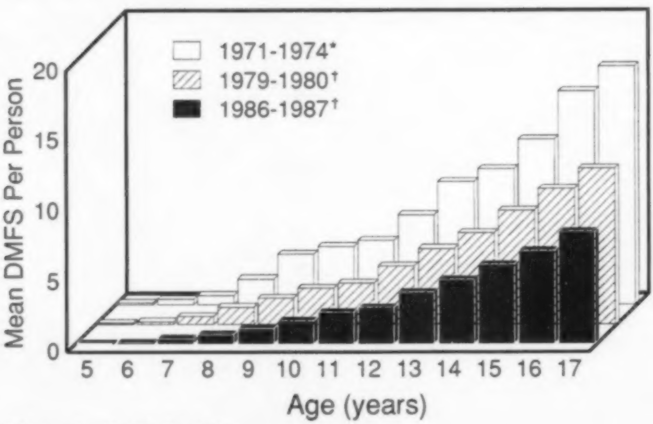
ranging from 12¢ to 21¢ for water systems serving populations greater than 200,000 persons, 18¢ to 75¢ for systems serving 10,000–200,000 persons, and 60¢ to $5.41 for systems serving fewer than 10,000 persons; the mean national weighted estimate is 51¢ (*10*). Of all persons receiving optimally fluoridated community drinking water, approximately 85% are served by water systems for which the annual per capita cost of fluoridation is 12¢–75¢ (*11*).

For 1990, the Health Care Financing Administration estimated that $34 billion (5% of all U.S. expenditures for health care) was spent for dental services (*12*), of which $4.5 billion (13.2%) may have been spent on dental amalgam restorations (American Dental Association, personal communication, 1992). Based on a national average cost per restoration of $40 (*13*) and a mean national weighted cost of 51¢ per person per year to fluoridate drinking water (*10*), each $1 expenditure for water fluoridation could result in a savings of $80 in dental treatment costs. Estimated nondiscounted per capita expenditures for water fluoridation during a lifetime ($38.25 at 51¢ per year for 75 years) are approximately equal to the average nondiscounted cost of one dental restoration.

Reported by: Div of Oral Health, National Center for Prevention Svcs, CDC.

Editorial Note: Since 1945, 9411 community water systems serving 8081 communities in the United States have instituted water fluoridation. By the end of 1989, approximately 70% of all U.S. cities with populations of more than 100,000—including 42 of the 50 largest cities—were fluoridating water. Thirty-five states, Puerto Rico, and the District of Columbia provide fluoridated water to more than half of their populations (*11*) (Figure 2), and nine states and Puerto Rico have enacted legislation for mandatory water fluoridation. Approximately 135 million U.S. residents are served by water supplies in which the fluoride concentration either has been adjusted

FIGURE 1. Mean number of decayed, missing, or filled tooth surfaces (DMFS) for children aged 5–17 years — three national U.S. surveys



*National Center for Health Statistics.
†National Institute of Dental Research.

Fluoridation — Continued

to an optimal level (126 million persons) or the natural fluoride content is sufficient for improved dental health (9 million persons) (*11*).

Because efforts to fluoridate drinking water were effective in reducing the risk for dental caries, dental researchers developed other methods to deliver fluoride to the public (e.g., fluoride-containing dentifrices, fluoride gels, fluoride mouth rinses, and dietary fluoride supplements). In addition, foods and beverages processed in fluoridated cities may be sold in nonfluoridated areas. The widespread use of these products assures that virtually all persons are exposed to fluoride. This exposure may have contributed substantially to the decrease in caries reduction observed during 1986–1987 (*1*) when comparing fluoridated and nonfluoridated communities.

The possibility of adverse effects of water fluoridation has been investigated since this preventive measure was first introduced. Although recent reviews have confirmed the benefit of exposure to appropriate levels of fluoride for dental health (*14,15*), a Public Health Service report (*14*) recommended further assessment of potential problems associated with or other aspects of fluoride use, such as the relation between fluoride intake and bone (i.e., osteosarcoma and bone fractures); the mechanisms of fluoride action on bone and teeth at the molecular level; the marginal risks, costs, and benefits of multiple fluoride regimens; the caries effect after a community discontinues water fluoridation; temporal changes in the prevalence of dental caries; and the prevalence and extent of dental fluorosis.

One national health objective for the year 2000 is to increase to at least 75% the proportion of persons served by community water systems providing optimal levels of fluoride (objective 13.9) (*16*)—a goal already achieved by 20 states and the District of Columbia (Figure 2) (*11*). To achieve this objective nationally, an additional 30 million persons must receive optimally fluoridated water from public water systems.

(Continued on page 381)

FIGURE 2. Percentage of states' population on public water who receive fluoridated drinking water — United States, 1989

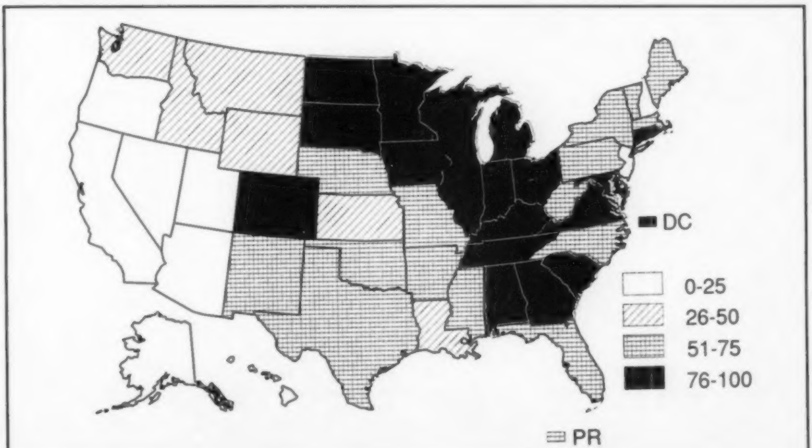
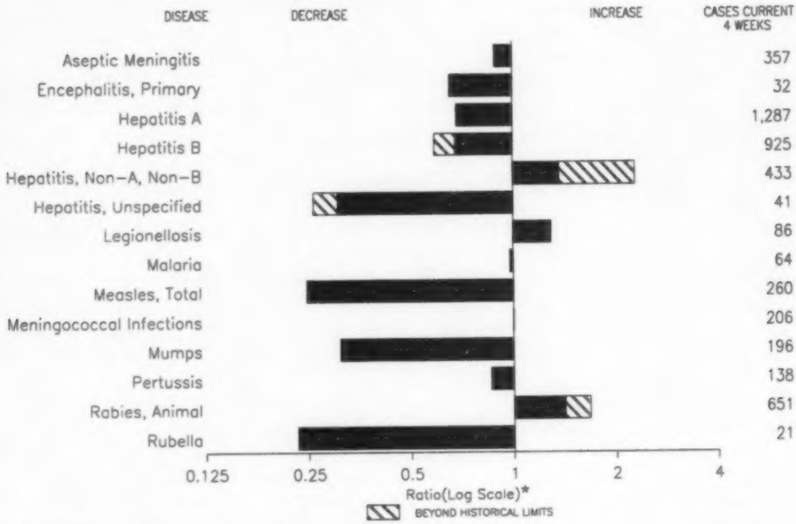


FIGURE I. Notifiable disease reports, comparison of 4-week totals ending May 23, 1992, with historical data — United States



*Ratio of current 4-week total to the mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending May 23, 1992 (21st Week)

	Cum. 1992		Cum. 1992
AIDS*	16,200	Measles: imported	74
Anthrax	-	indigenous	802
Botulism: Foodborne	8	Plague	1
Infant	23	Poliomyelitis, Paralytic†	-
Other	-	Psittacosis	31
Brucellosis	17	Rabies, human	-
Cholera	33	Syphilis, primary & secondary	13,884
Congenital rubella syndrome	4	Syphilis, congenital, age < 1 year	-
Diphtheria	2	Tetanus	7
Encephalitis, post-infectious	48	Toxic shock syndrome	100
Gonorrhea	191,332	Trichinosis	13
Haemophilus influenzae (invasive disease)	690	Tuberculosis	8,060
Hansen Disease	51	Tularemia	27
Leptospirosis	11	Typhoid fever	120
Lyme Disease	1,547	Typhus fever, tickborne (RMSF)	71

*Updated monthly; last update May 2, 1992.
†Nine suspected cases of poliomyelitis were reported in 1991; 4 of the 8 suspected cases in 1990 were confirmed, and all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending May 23, 1992 and May 25, 1991 (21st Week)

Reporting Area	AIDS*	Aseptic Menin-gitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionel-losis	Lyme Disease
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992
UNITED STATES	16,200	1,910	201	48	191,332	226,912	7,455	6,089	2,476	252	516	1,547
NEW ENGLAND	562	122	15	-	4,187	5,901	257	246	25	15	41	148
Maine	18	11	-	-	35	45	28	12	3	-	2	-
N.H.	19	5	2	-	-	134	16	18	9	1	3	8
Vt.	8	6	2	-	11	16	2	6	2	-	2	1
Mass.	313	43	8	-	1,517	2,520	126	181	8	14	21	41
R.I.	32	58	3	-	345	463	59	16	3	-	13	43
Conn.	172	-	-	-	2,279	2,723	26	13	-	-	-	55
MID. ATLANTIC	3,733	215	11	5	19,905	28,714	599	811	159	12	157	1,101
Upstate N.Y.	558	97	-	-	4,026	5,160	157	198	97	6	61	737
N.Y. City	1,942	28	2	1	6,438	11,561	188	104	3	-	3	-
N.J.	742	4	-	-	2,848	4,060	100	223	42	-	23	110
Pa.	491	86	9	4	6,593	7,933	154	286	17	6	70	254
E.N. CENTRAL	1,515	279	56	7	35,200	42,768	896	919	177	15	104	37
Ohio	287	79	22	1	11,278	12,865	198	109	47	-	54	21
Ind.	154	36	5	-	3,395	4,238	318	344	54	5	7	10
Ill.	619	54	11	3	10,679	12,978	170	69	16	3	5	2
Mich.	364	106	17	3	8,518	9,795	60	251	31	7	28	4
Wis.	91	4	1	-	1,330	2,892	150	146	29	-	10	-
W.N. CENTRAL	498	117	12	4	10,088	11,505	871	323	161	11	29	47
Minn.	88	9	1	-	1,144	1,109	267	25	7	2	2	2
Iowa	28	20	-	2	733	799	20	14	2	2	7	6
Mo.	264	48	8	-	5,891	7,035	241	242	142	6	8	34
N. Dak.	1	1	-	-	25	29	41	1	2	1	1	1
S. Dak.	3	3	-	1	74	145	163	2	-	-	-	-
Nebr.	18	10	1	1	4	764	71	12	-	-	10	1
Kans.	96	26	2	-	2,217	1,624	68	27	8	-	1	3
S. ATLANTIC	3,885	414	34	23	63,404	67,533	481	1,023	346	40	77	107
Del.	38	16	4	-	656	930	16	96	80	1	15	53
Md.	474	56	8	-	6,334	6,888	100	163	20	6	13	16
D.C.	330	7	-	-	2,990	4,068	7	41	108	-	7	-
Va.	205	71	9	6	7,518	6,591	45	75	15	13	10	21
W. Va.	24	2	1	-	354	488	4	22	-	7	-	1
N.C.	174	40	9	-	10,533	12,450	28	135	35	-	10	6
S.C.	145	6	-	-	4,626	4,970	10	23	2	-	15	-
Ga.	504	46	1	-	20,291	17,369	51	134	40	-	-	1
Fla.	1,991	170	2	17	10,102	13,779	220	334	46	13	7	9
E.S. CENTRAL	532	107	6	-	18,712	20,327	123	541	881	1	24	15
Ky.	62	37	4	-	1,690	2,193	28	34	-	-	13	5
Tenn.	157	36	1	-	6,097	8,053	61	457	877	-	9	9
Ala.	215	24	-	-	6,185	4,688	21	48	4	1	2	1
Miss.	98	10	1	-	4,740	5,393	13	2	-	-	-	-
W.S. CENTRAL	1,525	160	18	4	18,084	24,809	606	626	30	48	8	21
Ark.	79	4	7	-	3,554	2,870	35	32	5	3	-	1
La.	267	15	2	1	2,543	5,882	50	63	2	2	-	-
Okla.	100	-	1	2	1,879	2,668	82	100	17	2	4	12
Tex.	1,079	141	8	1	10,108	13,389	439	431	6	41	4	8
MOUNTAIN	462	60	10	1	4,223	4,639	1,092	298	95	27	36	1
Mont.	5	-	1	-	41	41	32	18	19	-	5	-
Idaho	7	9	-	-	52	65	22	34	1	-	3	-
Wyo.	3	-	-	-	21	43	1	2	5	-	1	-
Colo.	174	16	5	1	1,311	1,291	318	46	31	13	5	-
N. Mex.	43	6	3	-	367	436	129	97	12	7	2	-
Ariz.	120	16	1	-	1,548	1,725	481	52	13	3	11	-
Utah	40	-	-	-	92	147	79	4	8	4	1	1
Nev.	70	13	-	-	791	891	30	45	6	-	8	-
PACIFIC	3,488	436	39	4	17,529	20,716	2,530	1,302	602	83	40	70
Wash.	174	-	-	-	1,542	1,832	252	132	56	6	3	2
Oreg.	105	-	-	-	612	820	157	120	29	6	-	-
Calif.	3,142	393	36	3	14,850	17,561	2,011	1,041	483	69	36	68
Alaska	8	3	3	-	295	291	13	4	2	1	-	-
Hawaii	59	40	-	1	230	212	97	5	32	1	1	
Guam	-	-	-	-	39	-	7	2	-	2	-	1
P.R.	498	63	-	-	61	262	10	132	16	4	1	-
V.I.	2	-	-	-	47	231	6	4	-	-	-	-
Amer. Samoa	-	-	-	-	14	22	-	1	-	-	-	-
C.N.M.I.	-	-	-	-	30	19	-	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands
*Updated monthly; last update May 2, 1992.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 23, 1992, and May 25, 1991 (21st Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1992	1992	Cum. 1992	1992	Cum. 1992	Cum. 1991	Cum. 1992	1992	Cum. 1992	1992	Cum. 1992	Cum. 1991	1992	Cum. 1992	Cum. 1991
UNITED STATES	295	22	802	8	74	5,949	1,034	42	1,154	47	545	871	12	77	895
NEW ENGLAND	14	-	6	2	7	38	62	5	7	10	53	145	1	5	2
Maine	-	-	-	-	-	-	5	-	-	-	2	37	-	-	-
N.H.	2	-	1	-	-	-	5	1	1	6	21	12	-	-	1
Vt.	-	-	-	-	-	5	2	-	-	-	-	3	-	-	-
Mass.	7	-	5	-	3	17	27	-	1	3	25	84	-	-	1
R.I.	2	-	-	-	-	2	-	-	-	-	-	-	-	4	-
Conn.	3	-	-	2§	4	14	23	4	5	1	5	9	1	1	-
MID. ATLANTIC	82	2	143	-	9	3,718	108	2	81	-	62	88	1	13	497
Upstate N.Y.	12	-	64	-	2	236	52	2	35	-	20	55	-	9	481
N.Y. City	40	-	31	-	3	1,175	10	-	11	-	8	-	-	-	-
N.J.	16	-	45	-	1	912	17	-	10	-	11	7	-	3	-
Pa.	14	2	3	-	3	1,395	29	-	25	-	23	26	1	1	16
E.N. CENTRAL	16	2	22	-	8	71	150	2	154	-	37	162	-	5	162
Ohio	2	-	2	-	3	1	37	-	60	-	15	58	-	-	147
Ind.	4	2	18	-	-	1	24	-	6	-	11	34	-	-	1
Ill.	3	-	1	-	4	24	42	-	45	-	4	32	-	5	3
Mich.	6	-	1	-	-	38	40	2	41	-	1	20	-	-	11
Wis.	1	-	-	-	1	7	7	-	2	-	6	18	-	-	-
W.N. CENTRAL	16	-	5	2	3	29	51	1	38	2	38	59	1	4	13
Minn.	5	-	3	2§	2	6	7	-	7	1	15	21	-	-	5
Iowa	2	-	-	-	1	15	6	-	7	-	1	6	-	-	4
Mo.	6	-	1	-	-	-	21	1	17	-	14	20	-	-	4
N. Dak.	-	-	-	-	-	-	-	-	2	-	3	1	-	-	-
S. Dak.	1	-	-	-	-	-	1	-	-	-	2	1	-	-	-
Nebr.	-	-	-	-	-	-	6	-	3	-	2	4	-	-	-
Kans.	2	-	1	-	-	8	10	-	2	1	1	6	1	4	-
S. ATLANTIC	59	1	95	-	8	337	174	20	467	4	64	63	-	4	5
Del.	4	-	2	-	-	21	2	-	4	-	-	-	-	-	-
Md.	15	1	3	-	7	119	18	1	42	-	15	10	-	-	1
D.C.	5	-	-	-	-	-	-	-	2	-	-	-	-	1	1
Va.	13	-	5	-	1	21	32	-	20	-	4	10	-	-	-
W. Va.	-	-	-	-	-	-	14	1	20	-	3	6	-	-	-
N.C.	6	-	21	-	-	19	28	-	82	-	13	11	-	-	-
S.C.	-	-	29	-	-	12	14	-	46	-	9	-	-	-	-
Ga.	2	-	-	-	-	14	23	-	29	-	6	16	-	-	-
Fla.	14	-	35	-	-	131	43	18	222	4	14	10	-	3	3
E.S. CENTRAL	8	10	390	-	16	1	67	3	29	3	11	24	-	1	83
Ky.	-	10	388	-	-	-	25	-	-	-	-	-	-	-	-
Tenn.	4	-	-	-	-	1	15	1	11	-	5	12	-	1	83
Ala.	4	-	-	-	-	-	25	1	6	3	6	12	-	-	-
Miss.	-	-	2	-	16	-	2	1	12	-	-	-	-	-	-
W.S. CENTRAL	4	5	71	-	-	22	77	1	181	4	21	20	-	-	1
Ark.	-	-	-	-	-	5	8	1	5	1	9	1	-	-	1
La.	-	-	-	-	-	-	19	-	15	-	-	8	-	-	-
Okla.	2	5	9	-	-	-	9	-	13	3	12	11	-	-	-
Tex.	2	U	62	U	-	17	41	U	148	U	-	-	U	-	-
MOUNTAIN	11	-	1	1	5	467	58	-	70	3	94	111	-	2	4
Mont.	-	-	-	-	-	-	11	-	1	-	1	-	-	-	-
Idaho	-	-	-	-	-	89	8	-	3	-	13	15	-	1	-
Wyo.	-	-	1	-	-	-	2	-	-	-	-	3	-	-	-
Colo.	5	-	-	1†	5	5	9	-	5	-	20	58	-	-	1
N. Mex.	1	-	-	-	-	103	3	N	N	3	20	15	-	-	1
Ariz.	4	-	-	-	-	226	13	-	43	-	34	8	-	1	-
Utah	-	-	-	-	-	29	4	-	13	-	5	10	-	-	-
Nev.	1	-	-	-	-	15	8	-	5	-	1	2	-	-	2
PACIFIC	85	2	69	3	18	1,266	287	8	127	21	165	199	9	43	128
Wash.	6	-	-	3†	10	4	38	1	8	5	46	48	6	6	-
Oreg.	7	-	4	-	1	41	43	N	N	1	13	31	-	2	2
Calif.	66	1	40	-	5	1,218	196	1	109	15	101	83	3	34	124
Alaska	1	-	8	-	1	1	6	1	1	-	-	10	-	-	-
Hawaii	5	1	17	-	1	2	4	5	9	-	5	27	-	1	2
Guam	1	U	7	U	3	-	-	U	5	U	-	-	U	1	-
P.R.	-	-	5	-	-	56	3	-	1	-	8	14	-	-	-
V.I.	-	-	-	-	-	2	-	-	13	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	24	-	U	-	U	6	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	1	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 23, 1992, and May 25, 1991 (21st Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tularemia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992
UNITED STATES	13,884	17,027	100	8,060	8,287	27	120	71	3,267
NEW ENGLAND	249	465	9	209	223	-	12	2	295
Maine	-	-	-	27	16	-	-	-	-
N.H.	-	12	6	-	-	-	1	-	1
Vt.	1	1	-	2	1	-	-	-	-
Mass.	120	226	2	58	116	-	8	1	2
R.I.	16	19	1	81	20	-	-	1	-
Conn.	112	207	-	41	70	-	3	-	292
MID. ATLANTIC	2,049	3,026	11	1,881	1,932	-	36	1	1,011
Upstate N.Y.	148	103	4	139	134	-	5	-	584
N.Y. City	1,054	1,535	-	1,149	1,198	-	14	-	-
N.J.	269	581	-	331	352	-	12	-	309
Pa.	578	807	7	262	248	-	5	1	118
E.N. CENTRAL	1,802	1,832	29	889	877	-	14	6	47
Ohio	294	252	8	135	127	-	3	4	4
Ind.	103	60	7	72	66	-	-	1	3
Ill.	776	865	4	462	462	-	10	-	9
Mich.	389	449	10	185	185	-	1	-	4
Wis.	240	206	-	35	40	-	-	1	27
W.N. CENTRAL	564	305	13	154	230	8	1	3	610
Minn.	36	32	2	33	39	-	-	-	129
Iowa	16	25	4	15	29	-	-	-	88
Mo.	445	186	1	69	101	6	1	3	6
N. Dak.	1	1	1	2	4	-	-	-	55
S. Dak.	-	1	-	11	16	1	-	-	50
Nebr.	1	7	3	3	8	1	-	-	2
Kans.	65	53	2	21	33	-	-	-	280
S. ATLANTIC	3,973	5,161	12	1,564	1,493	3	10	16	645
Del.	88	66	3	17	14	-	-	1	103
Md.	303	410	1	105	138	2	1	-	199
D.C.	175	329	-	51	82	-	1	-	10
Va.	333	436	1	116	124	1	-	-	114
W. Va.	7	11	1	25	35	-	1	-	16
N.C.	966	773	3	213	175	-	-	11	2
S.C.	515	609	1	164	164	-	1	2	50
Ga.	837	1,252	1	343	283	-	-	-	146
Fla.	749	1,275	1	530	478	-	6	2	5
E.S. CENTRAL	1,867	1,857	-	484	568	5	2	8	57
Ky.	39	32	-	149	137	1	-	1	33
Tenn.	482	687	-	91	152	4	-	7	-
Ala.	793	685	-	170	153	-	-	-	24
Miss.	553	453	-	74	126	-	2	-	-
W.S. CENTRAL	2,492	2,931	1	674	920	5	1	33	314
Ark.	402	229	-	41	78	2	-	5	18
La.	1,001	981	-	56	68	-	-	-	-
Okla.	99	60	-	36	55	3	-	28	144
Tex.	990	1,661	1	541	719	-	1	-	152
MOUNTAIN	162	244	9	217	206	6	2	1	66
Mont.	2	2	-	-	-	2	-	-	8
Idaho	1	3	1	11	2	-	1	-	-
Wyo.	1	1	-	-	2	1	-	-	23
Colo.	19	39	2	16	6	-	1	-	1
N. Mex.	17	13	2	26	10	3	-	-	3
Ariz.	75	158	2	114	128	-	-	-	30
Utah	6	4	2	24	25	-	-	1	1
Nev.	41	24	-	26	33	-	-	-	-
PACIFIC	726	1,206	16	1,988	1,838	-	42	1	222
Wash.	42	74	-	126	122	-	3	-	-
Oreg.	24	32	-	45	39	-	-	-	-
Calif.	650	1,093	16	1,697	1,594	-	38	1	210
Alaska	1	3	-	24	29	-	-	-	12
Hawaii	9	4	-	96	54	-	1	-	-
Guam	2	-	-	34	-	-	1	-	-
P.R.	125	199	-	55	71	-	1	-	20
V.I.	23	56	-	3	1	-	-	-	-
Amer. Samoa	-	-	-	-	2	-	-	-	-
C.N.M.I.	5	-	-	12	4	-	1	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending May 23, 1992 (21st Week)

Reporting Area	All Causes, By Age (Years)						P&I†
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	667	445	129	54	20	19	37
Boston, Mass.	191	111	48	19	4	9	16
Bridgeport, Conn.	26	19	4	2	1	-	2
Cambridge, Mass.	29	23	4	2	-	-	3
Fall River, Mass.	24	19	4	1	-	-	1
Hartford, Conn.	66	36	12	9	5	4	1
Lowell, Mass.	23	19	4	-	-	-	-
Lynn, Mass.	16	14	1	1	-	-	-
New Bedford, Mass.	28	17	8	3	-	-	1
New Haven, Conn.	56	33	6	8	5	4	2
Providence, R.I.	70	52	15	3	-	-	-
Somerville, Mass.	9	7	2	-	-	-	-
Springfield, Mass.	40	28	6	2	2	2	3
Waterbury, Conn.	30	22	5	2	1	-	1
Worcester, Mass.	59	45	10	2	2	-	7
MID. ATLANTIC	2,668	1,657	546	321	81	62	143
Albany, N.Y.	56	34	14	6	-	2	4
Allentown, Pa.	19	13	2	4	-	-	2
Buffalo, N.Y.	101	75	17	7	-	2	3
Camden, N.J.	35	16	6	5	6	2	2
Elizabeth, N.J.	22	14	2	5	1	-	-
Erie, Pa.§	49	37	9	1	-	2	4
Jersey City, N.J.	41	28	6	5	1	1	1
New York City, N.Y.	1,298	763	290	186	36	23	57
Newark, N.J.	77	25	22	21	7	2	6
Paterson, N.J.	23	15	4	-	3	-	-
Philadelphia, Pa.	592	378	121	57	21	15	40
Pittsburgh, Pa.§	76	50	19	3	2	2	1
Reading, Pa.	8	5	1	1	-	1	-
Rochester, N.Y.	107	78	14	5	2	8	5
Schenectady, N.Y.	21	15	4	2	-	-	-
Scranton, Pa.§	19	17	2	-	-	-	3
Syracuse, N.Y.	75	55	9	8	1	2	11
Trenton, N.J.	28	21	4	3	-	-	4
Utica, N.Y.	21	18	-	2	1	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,212	1,359	407	235	140	71	105
Akron, Ohio	31	27	2	-	1	1	-
Canton, Ohio	36	23	3	7	2	1	4
Chicago, Ill.	511	206	113	99	82	11	13
Cincinnati, Ohio	138	102	26	6	2	2	14
Cleveland, Ohio	147	82	41	11	5	8	1
Columbus, Ohio	171	114	27	14	7	9	5
Dayton, Ohio	121	90	18	7	1	5	12
Detroit, Mich.	233	132	40	34	13	14	4
Evansville, Ind.	44	28	11	3	1	1	4
Fort Wayne, Ind.	48	41	3	1	2	1	5
Gary, Ind.	21	9	7	4	1	-	-
Grand Rapids, Mich.	52	35	10	2	2	3	3
Indianapolis, Ind.	191	135	27	18	5	6	11
Madison, Wis.	27	20	5	2	-	-	1
Milwaukee, Wis.	127	87	26	9	3	2	7
Peoria, Ill.	71	50	8	7	5	1	7
Rockford, Ill.	40	27	11	1	1	-	2
South Bend, Ind.	60	48	6	4	2	-	6
Toledo, Ohio	89	66	12	6	3	2	3
Youngstown, Ohio	54	37	11	-	2	4	3
W.N. CENTRAL	756	536	129	47	25	19	28
Des Moines, Iowa	71	43	17	4	5	2	1
Duluth, Minn.	25	17	3	2	2	1	2
Kansas City, Kans.	29	24	4	-	1	-	-
Kansas City, Mo.	106	67	29	7	2	1	4
Lincoln, Nebr.	40	35	2	1	1	1	4
Minneapolis, Minn.	147	108	21	11	3	4	9
Omaha, Nebr.	103	78	12	7	3	3	2
St. Louis, Mo.	131	87	25	11	6	2	-
St. Paul, Minn.	63	51	8	2	-	2	5
Wichita, Kans.	41	26	8	2	2	3	1
S. ATLANTIC	1,188	739	257	124	34	34	49
Atlanta, Ga.	189	107	43	26	4	9	3
Baltimore, Md.	180	118	32	18	6	6	13
Charlotte, N.C.	86	57	19	6	1	3	8
Jacksonville, Fla.	116	75	26	11	1	3	8
Miami, Fla.	112	67	27	11	7	-	-
Norfolk, Va.	47	26	11	5	3	2	-
Richmond, Va.	73	51	15	3	3	1	3
Savannah, Ga.	55	37	11	4	1	2	2
St. Petersburg, Fla.	61	42	11	4	1	3	-
Tampa, Fla.	134	88	27	15	2	2	11
Washington, D.C.	102	43	32	19	5	3	1
Wilmington, Del.	33	28	3	2	-	-	-
E.S. CENTRAL	704	457	161	61	15	10	44
Birmingham, Ala.	121	78	26	14	3	-	5
Chattanooga, Tenn.	61	44	9	7	1	-	4
Knoxville, Tenn.	95	59	21	9	5	1	4
Louisville, Ky.	U	U	U	U	U	U	U
Memphis, Tenn.	198	125	45	16	4	8	19
Mobile, Ala.	63	43	17	2	1	-	1
Montgomery, Ala.	51	38	10	2	1	-	1
Nashville, Tenn.	115	70	33	11	-	1	10
W.S. CENTRAL	1,436	851	282	185	69	49	92
Austin, Tex.	72	48	7	13	2	2	6
Baton Rouge, La.	38	29	2	4	2	1	2
Corpus Christi, Tex.	49	32	9	6	-	2	3
Dallas, Tex.	199	114	45	28	9	3	4
El Paso, Tex.	65	38	11	9	4	3	4
Ft. Worth, Tex.	99	62	24	7	4	2	5
Houston, Tex.	353	193	76	53	15	16	32
Little Rock, Ark.	81	50	18	11	-	2	6
New Orleans, La.	95	34	20	17	12	12	-
San Antonio, Tex.	212	134	41	20	14	3	17
Shreveport, La.	74	47	14	8	2	3	8
Tulsa, Okla.	99	70	15	9	5	-	5
MOUNTAIN	750	491	132	74	39	14	48
Albuquerque, N.M.	79	49	13	12	4	1	4
Colo. Springs, Colo.	39	27	9	1	1	1	5
Denver, Colo.	102	75	14	11	2	-	7
Las Vegas, Nev.	141	87	22	20	11	1	9
Ogden, Utah	23	14	5	1	3	-	1
Phoenix, Ariz.	162	96	34	16	8	8	12
Pueblo, Colo.	19	14	2	3	-	-	1
Salt Lake City, Utah	84	57	14	6	5	2	5
Tucson, Ariz.	101	72	19	4	5	1	4
PACIFIC	2,163	1,370	386	264	73	43	133
Berkeley, Calif.	12	10	2	-	-	-	-
Fresno, Calif.	113	42	20	9	11	13	6
Glendale, Calif.	36	28	5	3	-	-	3
Honolulu, Hawaii	72	52	17	2	1	-	8
Long Beach, Calif.	71	41	17	8	1	4	11
Los Angeles, Calif.	762	477	139	103	28	8	43
Pasadena, Calif.	30	26	4	-	-	-	6
Portland, Oreg.	131	90	24	9	8	-	5
Sacramento, Calif.	164	101	30	22	6	5	10
San Diego, Calif.	164	108	26	25	2	2	11
San Francisco, Calif.	151	89	26	31	2	3	1
San Jose, Calif.	146	98	25	14	5	3	12
Santa Cruz, Calif.	36	26	3	6	-	1	4
Seattle, Wash.	129	76	23	21	6	3	2
Spokane, Wash.	65	50	7	5	2	1	8
Tacoma, Wash.	81	56	18	6	1	-	3
TOTAL	12,544¶	7,905	2,429	1,365	496	321	679

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.
†Pneumonia and influenza.
§Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.
¶Total includes unknown ages.
U: Unavailable

Fluoridation — Continued

References

1. National Institute of Dental Research. Oral health of United States children: the National Survey of Dental Caries in U.S. School Children: 1986–87; national and regional findings. Bethesda, Maryland: US Department of Health and Human Services, Public Health Service, 1989; NIH publication no. 89-2247.
2. Striffler DF, Young WO, Burt BA. Dentistry, dental practice, and the community. 3rd ed. Philadelphia: WB Saunders, 1983.
3. Dunning JM. Principles of dental public health. 4th edition. Cambridge, Massachusetts: Harvard University Press, 1986.
4. Newbrun E. Effectiveness of water fluoridation. J Public Health Dent 1989;49:279–89.
5. Burt BA. The future of the caries decline. J Public Health Dent 1985;45:261–9.
6. NCHS. Basic data on dental examination findings of persons 1–74 years: United States, 1971–74. Hyattsville, Maryland: US Department of Health, Education, and Welfare, Public Health Service, 1979; DHEW publication no. (PHS)79-1662. (Vital and health statistics; series 11, no. 214).
7. National Institute of Dental Research. The prevalence of dental caries in United States children, 1979–80: National Dental Caries Prevalence Survey. Bethesda, Maryland: US Department of Health and Human Services, Public Health Service, 1981; NIH publication no. 82-2245.
8. Garcia AI. Caries incidence and costs of prevention programs. J Public Health Dent 1989;49:259–71.
9. CDC. Water fluoridation: a manual for engineers and technicians. Atlanta: US Department of Health and Human Services, Public Health Service, CDC, September 1986.
10. Burt BA. [Concluding statement]. In: Proceedings for the workshop: cost effectiveness of caries prevention in dental public health. J Public Health Dent 1989;49:338–40.
11. CDC. Fluoridation census 1989: summary. Atlanta: US Department of Health and Human Services, Public Health Service, 1991.
12. Palmer C. Dental spending hits $34 billion. American Dental Association News 1992;23:25.
13. American Dental Association. The 1990 survey of dental fees. Chicago: American Dental Association, 1992.
14. Public Health Service. Review of fluoride benefits and risks: report of the ad hoc subcommittee on fluoride of the committee to coordinate environmental health and related programs. Washington, DC: US Department of Health and Human Services, Public Health Service, 1991.
15. Kaminsky LS, Mahoney MC, Leach J, Melius J, Miller MJ. Fluoride: benefits and risks of exposure. Clinical Reviews in Oral Biology and Medicine 1990;1:261–81.
16. Public Health Service. Healthy people 2000: national health promotion and disease prevention objectives—full report, with commentary. Washington, DC: US Department of Health and Human Services, Public Health Service, 1991; DHHS publication no. (PHS)91-50212.

Current Trends

HIV Seroprevalence Among Adults Treated for Cardiac Arrest Before Reaching a Medical Facility — Seattle, Washington, 1989–1990

As part of an ongoing study of determinants of out-of-hospital cardiac arrest, the Seattle-King County Department of Health conducted an anonymous human immunodeficiency virus (HIV) serosurvey of these patients in Seattle from January 1989 through December 1990. The serum specimens were obtained from patients for whom cardiopulmonary resuscitation (CPR) was initiated by bystanders or emergency medical technicians (EMTs) and for whom endotracheal intubation and intravenous therapy were administered by paramedics. This report summarizes preliminary findings from this survey.

HIV Seroprevalence — Continued

The catchment area is served by one emergency medical response system. Blood specimens were obtained in the field (i.e., at the site of the cardiac arrest) from 604 (75%) of 805 patients aged 18–94 years who had CPR and endotracheal intubation and/or an intravenous catheter placed by paramedics. Persons who had an out-of-hospital cardiac arrest regardless of the underlying etiology (e.g., suspected drug overdose), except for those resulting from trauma, were included in the serosurvey. Those from whom specimens were obtained were similar in age and sex to those from whom specimens were not obtained (e.g., because the subject was not clinically stable). Blood specimens were obtained from 410 (68%) men and 194 (32%) women after essential emergency care had been provided and the patient was clinically stable, or unsuccessful resuscitation efforts were terminated. The serum specimens were grouped by sex and age of patients; all personal identifiers were removed before HIV testing. Blood specimens were screened for HIV antibody by enzyme immunoassay (EIA); specimens repeatedly reactive by EIA were evaluated by Western blot, which was interpreted according to standard criteria (*1*).

Of the 604 serum specimens tested, five (0.8%) were HIV seropositive (95% confidence interval [CI] = 0.1%–1.5%). All five were men aged 35–55 years, including three ([12%] 95% CI = 1%–24%) of 26 men aged 35–44 years and two ([5%] 95% CI = 2%–12%) of 38 men aged 45–54 years.

To determine whether information collected and recorded by paramedics on the emergency medical service incident report (e.g., observing drug paraphernalia at the scene of the cardiac arrest or reported history of injecting-drug use [IDU]) would predict seropositivity, anonymous testing was repeated on 19 specimens obtained from men with histories of IDU documented by the incident report. Two of the five HIV seropositive men were identified among this high-risk subset; two ([11%] 95% CI = 3%–24%) of 19 men with evidence of IDU and three ([0.8%] 95% CI = 0.1%–1.6%) ($p = 0.01$) of the 391 men without evidence of IDU were seropositive.

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Editorial Note: The seroprevalence of HIV in patients treated in emergency departments has been described previously (*2,3*). However, the seroprevalence in persons who have had an out-of-hospital cardiac arrest and received CPR in the field has not been characterized. In this report, the overall seroprevalence in such persons in Seattle was relatively low, and serologic evidence of HIV infections was not detected among women or among men aged ≥55 years. Although HIV seroprevalence was highest in men known to have been injecting-drug users, information suggesting this or other potential risk factors for HIV infection was not available to persons who provided assistance to many of the patients in this study.

Under nontraumatic circumstances, the risk for HIV transmission would be expected to be low for persons initiating CPR, since CPR does not usually create the potential for parenteral or mucous membrane exposures to blood (*4–6*). HIV transmission has not been reported in paramedics or EMTs who have been exposed to infected persons during out-of-hospital cardiac arrest.

The risk for occupationally acquired HIV infection is likely to be similar for emergency medical service personnel who may be exposed to blood splashes or who must use sharp instruments or medical devices during out-of-hospital resuscitations

HIV Seroprevalence — Continued

and for health-care workers who provide the same type of care for HIV-infected patients in the hospital (*7–9*). Because HIV-infection (as well as hepatitis B and other bloodborne pathogen) status is unknown for most persons who have an out-of-hospital cardiac arrest (*2,3,7*), emergency medical service personnel should adhere to universal precautions during resuscitation attempts (*7–9*).

References

1. CDC. Interpretation and use of the Western blot assay for serodiagnosis of human immunodeficiency virus type 1 infections. MMWR 1989;38(no. S-7).
2. Kelen GD, Fritz S, Qaqish B, et al. Unrecognized human immunodeficiency virus infection in emergency department patients. N Engl J Med 1988;318:1645–50.
3. Baker JL, Kelen GD, Silvertson KT, Quinn TC. Unsuspected human immunodeficiency virus in critically ill emergency patients. JAMA 1987;257:2609–11.
4. Saviteer SM, White GC, Cohen MS, Jason J. HTLV-III exposure during cardiopulmonary resuscitation [Letter]. N Engl J Med 1985;313:1606–7.
5. Goebel F-D, Zoller WG, Erfle V, Hehlmann R. Resuscitation of patients with AIDS: risk of HIV transmission. AIDS-Forschung 1988;5:277–8.
6. Bolon T, Patrone-Reese J, Dearmas L, Fayne T, Tulsie N. Reported, self-perceived, serious body fluid exposures among emergency medical technicians, paramedics, and firefighters [Abstract]. Vol 2. VI International Conference on AIDS, San Francisco, June 20–24, 1990:417.
7. CDC. Recommendations for prevention of HIV transmission in health-care settings. MMWR 1987;36(no. 2S).
8. CDC. Update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other bloodborne pathogens in health-care settings. MMWR 1988;37:377–82,387–8.
9. CDC. Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. MMWR 1989;38(no. S-6).

Epidemiologic Notes and Reports

Nitrogen Dioxide and Carbon Monoxide Intoxication in an Indoor Ice Arena — Wisconsin, 1992

On February 23, 1992, the Wisconsin Department of Health and Social Services (DHSS) was notified that 11 students from two high schools had been treated in two emergency rooms for acute respiratory symptoms (ARS) (i.e., cough, hemoptysis, chest pain, and dyspnea); two students were hospitalized. All of the students had participated in an indoor ice hockey tournament the previous night.

On February 23, DHSS interviewed 12 players and spectators who had attended the game, some of whom reported acute respiratory manifestations that began during the game and intensified as the game continued. Others reported central nervous system manifestations, including headache, dizziness, sleepiness, nausea, and vomiting.

On February 25, DHSS administered a questionnaire to all 2215 students from the two high schools. The questionnaire asked whether they had attended the game and whether they had experienced any symptoms on the following days. Of the 1734 (78%) students who completed the questionnaire, 131 reported having attended the game.

A case of ARS was defined as cough with acute onset, hemoptysis, dyspnea, chest pain, or coughing spells within 48 hours after the start of the game. A case of central nervous system symptoms (CNSS) was defined as headaches, sleepiness, dizziness, nausea, or vomiting within 24 hours after the start of the game. Among 131 attendees,

Carbon Monoxide Intoxication — Continued

63 (48%) reported illness, including 23 cases of ARS, six cases of CNSS, and 34 cases of both. Time at onset of ARS was 1–32 hours (mean: 4 hours) after the beginning of the game; time at onset of CNSS was 1–24 hours (mean: 2 hours) after the beginning of the game.

The risk for ARS among players (19%) was more than twice that among spectators (relative risk = 2.2; 95% confidence interval = 1.4–3.2), but the risk for CNSS among the two groups was similar. Risks did not vary by sex, smoking status, and presence of other respiratory conditions.

During simulation tests on February 24, levels of nitrogen dioxide of 1.5 parts per million (ppm) were detected in the air over the rink after use of an ice resurfacing machine powered by an internal combustion engine. These levels exceed the standard set by the Occupational Safety and Health Administration of 1.0 ppm for short-term (i.e., 15 minutes) exposures and are above the standard of 0.5 ppm established in Minnesota for indoor ice arenas.* The concentration of carbon monoxide was 150 ppm—five times higher than the recommended level of 30 ppm for ice arenas in Minnesota. Higher concentrations may have been reached the night of the game because the arena and the ice resurfacing machine had been operating since early morning.

An inspection of the arena and the ice resurfacing machine showed that the engine had not been properly serviced, and the air intake of the main ventilation system in the arena was not working. Neither the locker nor referee rooms—which were adjacent to the room where the ice resurfacing machine was stored—were equipped with vent systems.

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Editorial Note: Although episodes of intoxication by either nitrogen dioxide or carbon monoxide in indoor arenas have been documented previously, this report describes concurrent intoxication by both toxins. Persons exposed to toxic levels of nitrogen dioxide are at increased risk for acute respiratory manifestations, such as those described in this report (*1,2*); CNSS suggest carbon monoxide intoxication (*3,4*). Both gases can be produced in indoor ice arenas by internal combustion engines used in ice resurfacing equipment. Additional sources of carbon monoxide are gas-powered radiant heaters used to heat the stands (*5–8*).

In general, players may be at greater risk than spectators for intoxication from nitrogen dioxide because 1) nitrogen dioxide gas is heavier than air and tends to be present at higher concentrations near ice surfaces; 2) a thermic inversion, caused by the presence of cold air over the ice, and plexiglas shields surrounding rinks may impair air circulation over rinks; and 3) the locker rooms were located next to the ice resurfacing machine storage room and had no ventilation system, which may have allowed build-up of a high concentration of gases.

Although there are more than 800 indoor ice arenas in the United States (*8*), only three states have established standards for ice arena air quality. To prevent the occurrences of nitrogen dioxide and carbon monoxide intoxication in indoor arenas, states that have indoor arenas should consider recommending 1) education of those

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*Minnesota standards are cited as a point of reference because Wisconsin does not regulate air quality of indoor arenas.

Carbon Monoxide Intoxication — Continued

who operate arenas in the prevention of these risks, 2) proper maintenance of ice resurfacing machines and heating systems, 3) adequate air circulation systems capable of exchanging the air throughout the arena, 4) continuous air monitoring to detect dangerous levels of toxins, and 5) use of battery-operated resurfacing equipment.

References

1. Douglas WW, Hepper NGG, Colby TV. Silo-filler's disease. Mayo Clin Proc 1989;64:291–304.
2. Ramirez J, Dowell AR. Silo-filler's disease: nitrogen dioxide-induced lung injury. Long-term follow-up and review of the literature. Ann Intern Med 1971;74:569–76.
3. Larcan A, Lambert H. Current epidemiological, clinicobiological, and therapeutic aspects of acute carbon monoxide poisoning. Bull Acad Natl Med (Paris) 1981;165:471–8.
4. Thompson N, Henry JA. Carbon monoxide poisoning: poisons unit experience over five years. Hum Toxicol 1983;2:335–8.
5. Anderson DE. Problems created for ice arenas by engine exhausts. Am Ind Hyg Assoc J 1971;790–801.
6. Paulozzi LJ, Satink FA. A carbon monoxide mass poisoning in an ice arena in Vermont [Letter]. Am J Public Health 1991;81:222.
7. Levesque B, Dewailly E, Lavoie R, Homme DP, Allaire S. Carbon monoxide in ice skating rinks: evaluation of absorption by adult hockey players. Am J Public Health 1990;80:594–8.
8. Hedberg K, Hedberg CW, Iber C, et al. An outbreak of nitrogen dioxide-induced respiratory illness among ice hockey players. JAMA 1989; 262:3014–7.

Notices to Readers

NIOSH Recommendations for Occupational Safety and Health: Compendium of Policy Documents and Statements

CDC's National Institute for Occupational Safety and Health (NIOSH) has released *NIOSH Recommendations for Occupational Safety and Health: Compendium of Policy Documents and Statements* * (*1*). The publication provides a comprehensive list of NIOSH documents that contain recommendations for safety and health standards in the workplace. It is designed to make this information conveniently available to workers, employers, occupational health professionals, and union representatives. The publication includes two major sections. Section A lists all NIOSH documents containing recommendations for chemical, physical, and other hazards in the workplace. Section B contains the NIOSH recommended exposure limits (RELs) for all these hazards as well as the adverse health effects associated with the chemicals and physical hazards. Five appendices include additional information about classes of chemicals and RELs adopted or revised during the Occupational Safety and Health Administration's rule-making activity in 1988. A subject index and an index by chemical abstracts service numbers are included.

Reference

1. NIOSH. NIOSH recommendations for occupational safety and health: compendium of policy documents and statements. Cincinnati: US Department of Health and Human Services, Public Health Service, CDC, 1992; DHHS publication no. (NIOSH)92-100.

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*Single copies of this document are available without charge from the Information Dissemination Section, Division of Standards Development and Technology Transfer, NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226; telephone (513) 533-8287.

Notices to Readers — Continued

Criteria for a Recommended Standard: Occupational Exposure to Ethylene Glycol Monomethyl Ether, Ethylene Glycol Monoethyl Ether, and Their Acetates

CDC's National Institute for Occupational Safety and Health (NIOSH) recently published a document entitled *Criteria for a Recommended Standard: Occupational Exposure to Ethylene Glycol Monomethyl Ether, Ethylene Glycol Monoethyl Ether, and Their Acetates** (*1*). This document examines the occupational health risks associated with exposure to ethylene glycol monomethyl ether (EGME), ethylene glycol monoethyl ether (EGEE), and their acetates—ethylene glycol monomethyl ether acetate (EGMEA) and ethylene glycol monoethyl ether acetate (EGEEA). Criteria are also provided for eliminating or minimizing the risks encountered by workers during the manufacture and use of these glycol ethers.

These glycol ethers adversely affect the blood, liver, and kidneys and the central nervous and hematopoietic systems. Studies in animals have demonstrated dose-related malformations, growth retardation, and embryonic death in the offspring of pregnant animals exposed to airborne concentrations of EGME or EGEE at or below their respective Occupational Safety and Health Administration permissible exposure limits (PELs). In addition, testicular atrophy and infertility occurred in male animals exposed to airborne concentrations of EGME or EGEE at or below their PELs. EGMEA and EGEEA have the same potential for reproductive and developmental effects as the parent compounds because they are metabolized to EGME and EGEE, respectively.

NIOSH therefore recommends that exposure to EGME and EGMEA in the workplace be limited to 0.1 part per million (ppm) (0.3 mg EGME/m^3 and 0.5 mg EGMEA/m^3) as a time-weighted average (TWA) for up to 10 hours per day during a 40-hour workweek. NIOSH also recommends that exposure to EGEE and EGEEA be limited to 0.5 ppm (1.8 mg EGEE/m^3 and 2.7 mg EGEEA/m^3) as a 10-hour TWA. Exposure to these glycol ethers shall be reduced using state-of-the-art engineering controls and work practices. Dermal contact is prohibited because EGME, EGEE, and their acetates are readily absorbed through the skin.

Reference

1. NIOSH. Criteria for a recommended standard: occupational exposure to ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, and their acetates. Cincinnati: US Department of Health and Human Services, Public Health Service, CDC, 1991; DHHS publication no. (NIOSH)91-119.

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*Single copies of this document are available without charge from the Information Dissemination Section, Division of Standards Development and Technology Transfer, NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226; telephone (513) 533-8287.

Availability of Position Papers on Injury Control

CDC's National Center for Environmental Health and Injury Control (NCEHIC) and National Institute for Occupational Safety and Health have sponsored the development of position papers on motor-vehicle injury prevention, prevention of violence and violence-related injury, home and leisure injury prevention, occupational injury prevention, trauma-care systems, acute-care treatment, and rehabilitation. The papers resulted from the Third National Injury Control Conference.

Notices to Readers — Continued

The objectives of the position papers are to 1) define the field of injury control, 2) assess the status of injury-control research and programs, 3) help CDC, other federal agencies, and nongovernmental organizations clearly define directions and priorities in a coordinated way, 4) identify what interventions should be evaluated and disseminated, 5) plan for the development of injury-control capacity in state and local health departments and other agencies, and 6) identify organizations and opportunities to implement various research and programmatic recommendations.

Copies of the position papers are available from the Division of Injury Control, NCEHIC, CDC, Mailstop F-36, 1600 Clifton Road, NE, Atlanta, GA 30333.

Erratum: Vol. 41, No. 18

In the notice to readers, "Change in the Reporting of AIDS Cases," on page 325, two numerals in the telephone number for the CDC National AIDS Clearinghouse were transposed. The correct telephone number is (800) 458-5231.

The *Morbidity and Mortality Weekly Report* (*MMWR*) Series is prepared by the Centers for Disease Control and is available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 783-3238.

The data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. Inquiries about the *MMWR* Series, including material to be considered for publication, should be directed to: Editor, *MMWR* Series, Mailstop C-08, Centers for Disease Control, Atlanta, GA 30333; telephone (404) 332-4555.

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